★ SIDEWINDER KEY BITTING ★
★ 2014 EDITION ★

This reference may be used as an aid when duplicating, decoding, and originating keys, as well as understanding master/valet functionality and diagnosing problems associated with worn or badly cut keys. Sidewinder keys may generally be decoded by sight if the general characteristics for the specific key type are understood.

Lishi numbers are listed where applicable, as they have become the common way to refer to a specific key/lock format.

~ INDEX ~

SIDEWINDER KEY TERMINOLOGY

<u>SIDEWINDER KEY</u> - An automotive key of which the bitting is a wavy groove milled in the side of the blade. <u>Note</u>: Use of the term "Sidewinder" dates to the early 1980's when these locks were new to the automotive industry, but the term is a point of contention. Various sources may also use alternate terms such as Track Key, Laser Key or Side Mill Key.

<u>LASER CUT</u> - A method of key bitting that removes the steeples between adjacent cuts.

<u>TRACK</u> - The contiguous bitting surface of a sidewinder key.

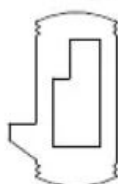<u>WEB</u> - The uncut center wall of the blade, expressed as a thickness dimension.

<u>SPLIT WAFER</u> - A wafer tumbler that does not completely surround the key blade, typically with two tumblers for each bitting position. This means each tumbler of a pair contacts alternate tracks of the same space position. ASP refers to these as Half Tumblers.
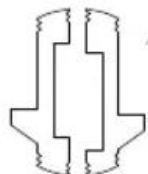
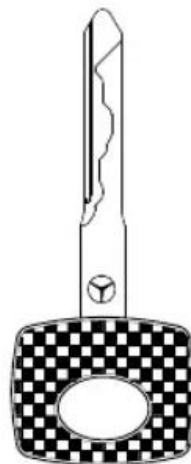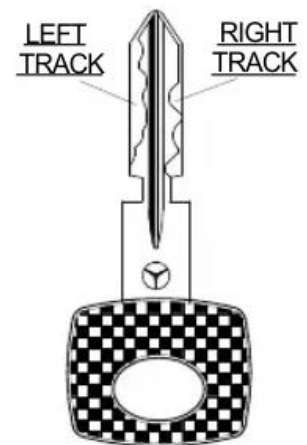<u>LEFT / RIGHT TRACK</u> - Think of the track designation as the side it is always on with the key clamped in a key machine. Alternately, Instacode refers to these as Side A and Side B.

LEFT TRACK   RIGHT TRACK

2-TRACK   4-TRACK INTERNAL CUT   4-TRACK EXTERNAL CUT

SPLIT WAFERS   Right   Left

<u>RIGHT / LEFT FORMAT</u> - Full wafers with the tumbler contact opposite the spring tab are most often considered Right format, and tumblers with the contact on the same side of the spring tab are Left format. This convention is found where tumblers are marked R or L by a few manufacturers, and is also in accordance with ASP designations.

Locks produced domestically by Strattec for Ford and GM use opposite designations from the above convention.

SIDEWINDER KEY BITTING

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MERCEDES 2-Track 10-Cut OLD FORMAT - To '93

STOP
Created By
Cutting Process

.098" .188 .278 .367 .457 .546 .636 .725 .815 .904

1.255" (approx.)
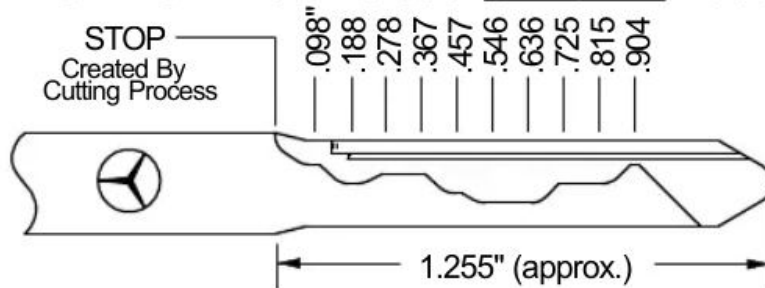
NOTE: Keys manufactured by Huf are typically cut .001" shallower.
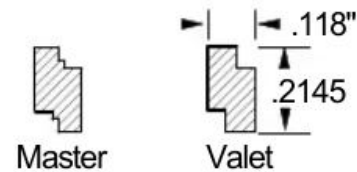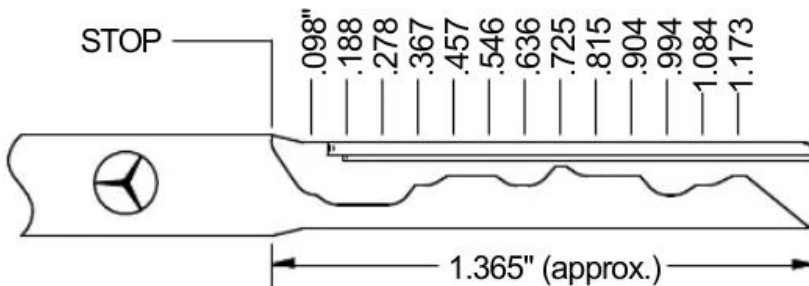
All Mercedes 2-Track keys contain at least two #5 depth cuts.
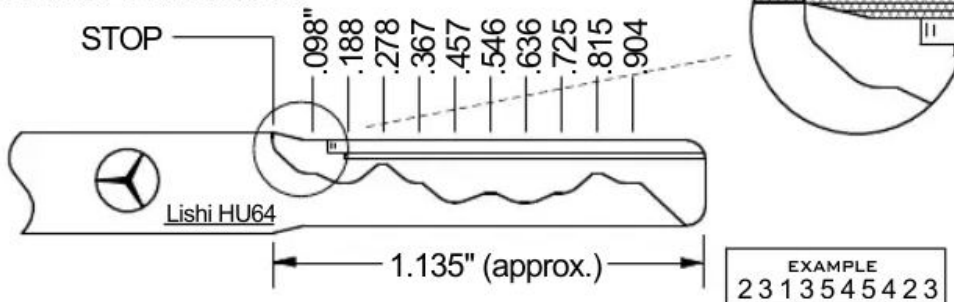
EXAMPLE
1 3 2 2 4 5 5 3 3 1

DEPTHS
1 - .154"
2 - .130
3 - .106
4 - .083
5 - .059
Incr. - .0236
Web - .040
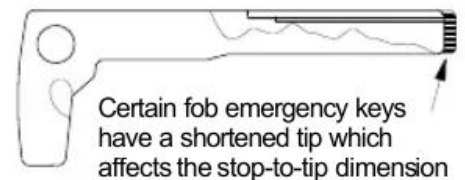MACS - 2

MERCEDES 2-Track 13-Cut Alarm Key '84-'93

STOP

.098" .188 .278 .367 .457 .546 .636 .725 .815 .904 .994 1.084 1.173

1.365" (approx.)

EXAMPLE
4 5 5 3 2 2 3 1 2 2 4 3 2
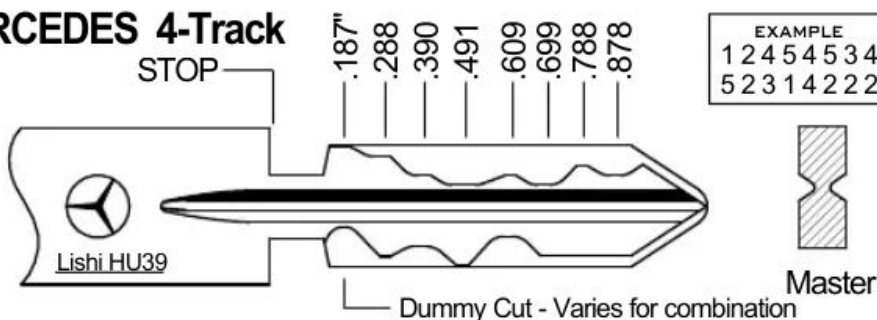
.118"
.2145

Master   Valet

Most 2-Track keys form the stop by the cutting process. On all keys which have a widened neck such as this Mercedes, the stop should be at the point where the transition from wide to narrow begins.
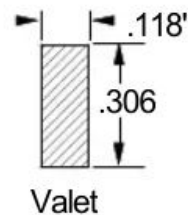
If the stop is formed closer to the tip, the integrity of the stop will be diminished.

MERCEDES 2-Track 10-Cut NEW FORMAT - '94+
CHRYSLER Crossfire

STOP

.098" .188 .278 .367 .457 .546 .636 .725 .815 .904

Lishi HU64

1.135" (approx.)

EXAMPLE
2 3 1 3 5 4 5 4 2 3

Certain fob emergency keys have a shortened tip which affects the stop-to-tip dimension

MERCEDES 4-Track

STOP

.187" .288 .390 .491 .609 .699 .788 .878

Lishi HU39

Dummy Cut - Varies for combination

EXAMPLE
1 2 4 5 4 5 3 4
5 2 3 1 4 2 2 2

.118"
.306

Master   Valet

DEPTHS
1 - .301"
2 - .277
3 - .253
4 - .229
5 - .205
Web - .040
Incr. - .0236
MACS - See Text

The first position will have only one active cut which may be either on the left or right track depending on the code. The active cut will always be depth #1 thru #4. The opposing cut will always be a dummy #5 depth. #1 depths are not used in positions 5 thru 8. Note the spacing varies which in essence groups the tumblers (positions 1 - 4 and postions 5 - 8). This spacing results in a MACS of 2, except between positions 4 and 5 of which the MACS is 3. MACS does not apply to the dummy cut.
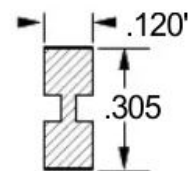
SIDEWINDER KEY BITTING

2014 EDITION

LEXUS 16-Cut
MAZDA Millenia
KIA Amanti

.881" .787 .692 .598 .503 .409 .314 .220 STOP

Lishi TOY40
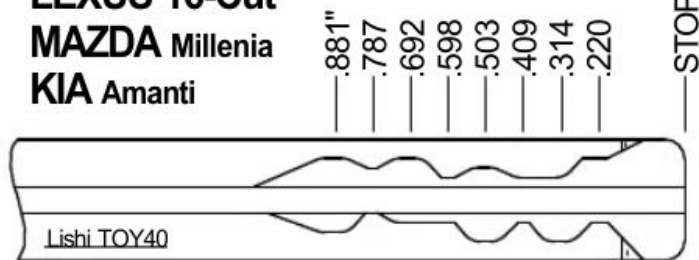
EXAMPLE
2	3	2	4	3	4	4	2
3	5	4	4	2	4	2	4

5-5 and 5-4 opposing cut combinations do not occur in the same postion

★ Code Series:
O0001 - O5000 Lexus
20001 - 22825 Mazda
L0001 - L1000 Kia

Valet Cut - Right Track
Master = 4
Valet = 2

.120"
.305

DEPTHS
1 - .024"
2 - .047
3 - .071
4 - .095
5 - .118
Incr. - .0236
Web - .040
MACS - 2
(except valet cut)

LEXUS / TOYOTA
10-Cut '98 +

.598" .503 .409 .314 .220 STOP

Lishi TOY48
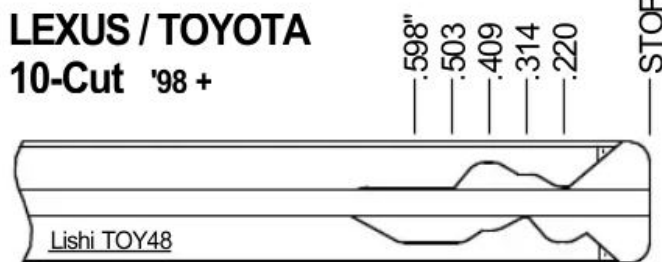
EXAMPLE
5	5	1	3	1
1	1	3	5	1

5-5 opposing cut combinations do not occur in the same postion

★ Code Series:
40000 - 49999

Master   Valet
.120"
.305
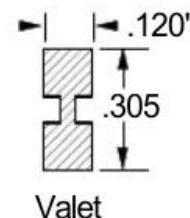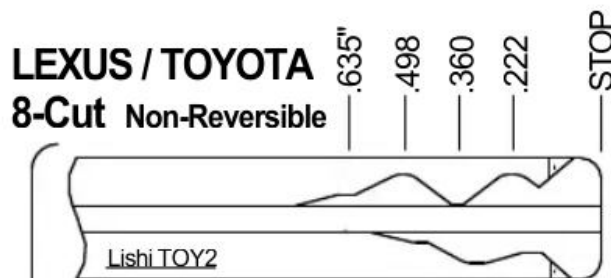
1 3 5
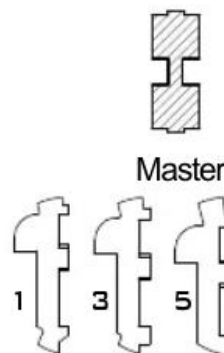
NOTE: Lexus 10-Cut tumblers are not stamped with numbers, but may easily be identified by sight

DEPTHS
(1) 1 - .052"
(2) 3 - .082
(3) 5 - .113
Incr. - .0305
Web - .040
MACS - None

LEXUS / TOYOTA
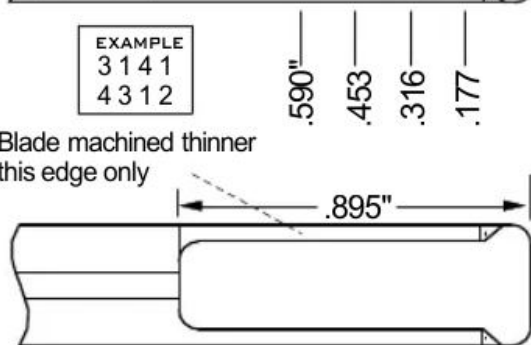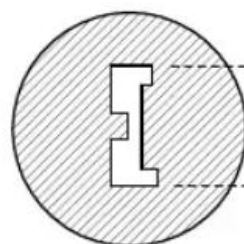### 8-Cut Non-Reversible

.635" .498 .360 .222 STOP

Lishi TOY2

EXAMPLE
3	1	4	1
4	3	1	2

.590" .453 .316 .177

Blade machined thinner this edge only

.895"

Non-Bitted Side

.069"
.095
.120
☞ This edge thinner

.042
(2 Places)

Machined Profile

★ Code Series:
80000 - 89999

.120"
.305

.069

Keyway of Lock
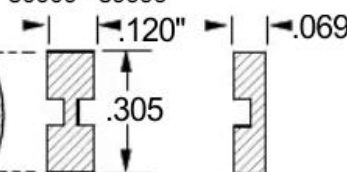
Thin Version

DEPTHS
(I) 1 - .041"
(N) 2 - .069
(S) 3 - .092
(Y) 4 - .118
Incr. - .0256
Web - .030
MACS - None

This key is bitted on only one side, and is not reversible in the lock. Factory blanks come machined on the non-bitted side, but these can be made from the old style Lexus key by machining as indicated. The non-bitted side must be machined using two planes of cut depth to bypass keyway warding as shown.

The web of the key is not centered exactly, due to the nature of the machining. The tumblers are stamped with letters which correspond to depths as indicated. The thin version is used on some later vehicles, and has no grooving on the non-bitted side.
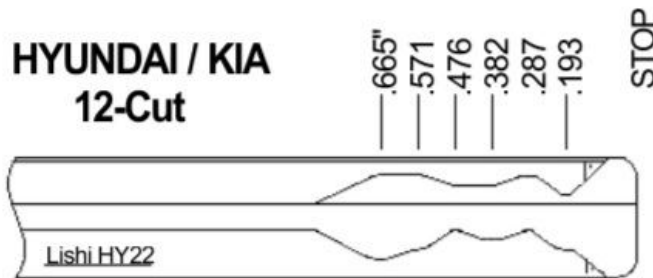
* Factory keys are cut with a smaller diameter cutter than the customary 2.5mm. Certain combinations may be a challenge to duplicate, as a 2.5mm tracer may not pass between opposing tracks at some positions.
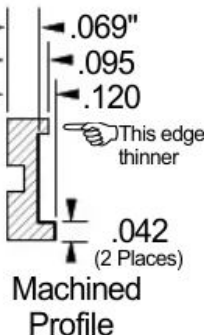
SIDEWINDER KEY BITTING
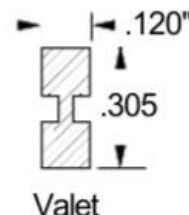
2014 EDITION

HYUNDAI / KIA 12-Cut

.665" .571 .476 .382 .287 .193 STOP

Lishi HY22

EXAMPLE
1 1 2 2 1 3
1 2 4 3 4 2

4-4 and 4-3 opposing cut combinations do not occur in the same position

Master   Valet

.120"
.305

★ Code Series:
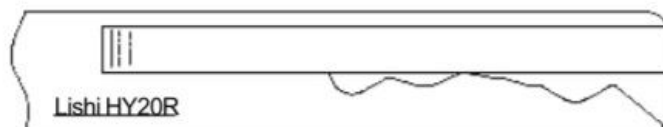G0001 - G2500
J0001 - J2500
K0001 - K2500

NOTE: The Lexus 16-cut format split tumblers can be used to combinate these locks. Use Lexus 2-5 for Hyundai / Kia 1-4.

DEPTHS
1 - .047"
2 - .071
3 - .095
4 - .118
Incr. - .0236
Web - .040
MACS - 2

HYUNDAI 2-Track Right
Santa Fe '13+

Lishi HY20R

EXAMPLE
2 4 3 5 4 3 1 3

★ Code Series:
C1001 - C3500

.306
.118"

HYUNDAI 2-Track Left
Accent '12+

.799 .705 .610 .516 .421 .327 .232 .138 STOP

Lishi HY20
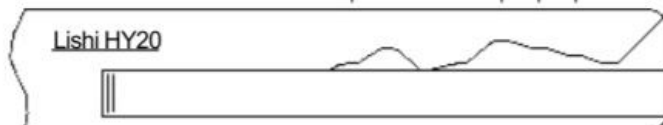
EXAMPLE
4 2 5 4 1 2 3 4

★ Code Series:
T1001 - T3500

.118"
.306

DEPTHS
1 - .078"
2 - .098
3 - .118
4 - .137
5 - .157
Incr. - .0197
Web - .030
MACS - 3
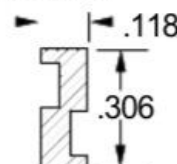
HYUNDAI / KIA 7-Cut
Cadenza '13+ / Equus '14+

.622" .457 .291 .126 STOP

Lishi K9
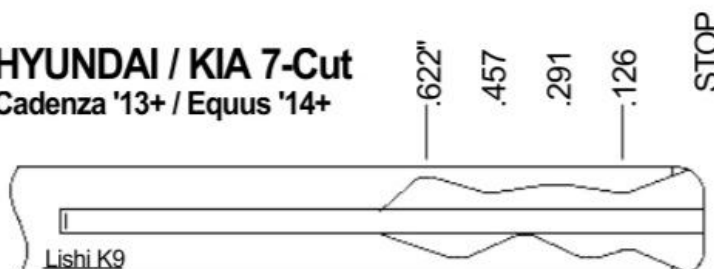
EXAMPLE
1 3 2 3
2 5 2

.539 .374 .209

★ Code Series:
U0001 - U2500 Kia
I 0001 - I 2608 Hyundai
(code prefix is the letter "I")

.118"
.276
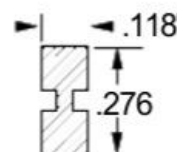
DEPTHS
1 - .024"
2.- .043
3 - .063
4 - .083
5 - .102
Incr. - .0197
Web - .040
MACS - None

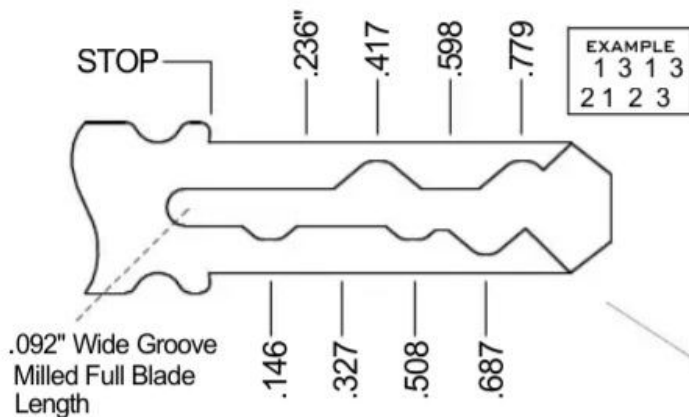# SIDEWINDER KEY BITTING
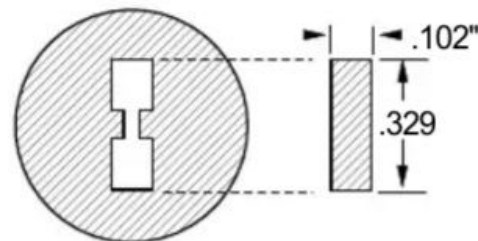
2014 EDITION

BMW MOTORCYCLE

★ Code Series:
K05001- K05600 ?

The extent of the code range is not known at this time.

STOP

.236" .417 .598 .779

EXAMPLE
1 3 1 3
2 1 2 3

.092" Wide Groove
Milled Full Blade
Length

.146 .327 .508 .687

NOTE: The BMW and Ducati, etc. lock formats are similar, with the same depths, cut-to-cut dimension, and bitting characteristics. However, the first tumbler location, bow-to-first-cut dimension, and number of tumblers are different.

The BMW key presents the same problem for duplication as described below, for the Ducati. The technique for cutting these keys with the common 2.5mm diameter cutter using either a computerized key machine, or duplicating machine should be just as viable. If using a manual duplicator, you would need a BMW specific prep key. See the Ducati key text for a description.

DUCATI / PIAGGIO / KTM
APRILIA / MOTO GUZZI

STOP

.098" .280 .461 .642 .823

.092" Wide Groove
Milled Full Blade
Length

.189 .370 .551 .732

"PREP KEY"

◄— .102"

.329

DEPTHS
1 - .118"
2 - .083
3 - .047
Incr. - .0354
Web - .024
MACS - None

Keyway of Lock
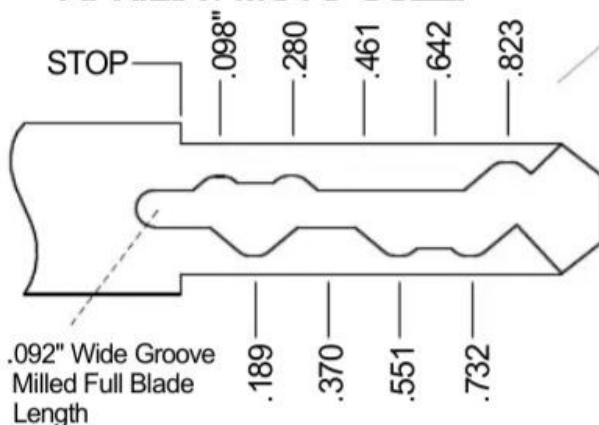
EXAMPLE
2 2 1 1 3
3 1 3 3

★ Code Series:
Z2001 - Z9416

NOTE: Factory keys are cut slightly different than other sidewinder keys in that they are not truly laser cut (steeples are not totally removed), and the bitting angle does not vary for different adjacent cuts. A groove must be milled straight down the center to bypass keyway warding as can be seen from the illustration. It is not necessary to cut keys exactly as the factory.

PROBLEM: Most sidewinder machines use a 2.5 mm (.098") diameter cutter. These factory keys are cut with a smaller diameter cutter which is necessary as the distance between opposing #1 depth cuts is .092". Consequently you cannot use most machines to trace these keys as the tracer will not pass through certain positions at opposing shallow depths.

To avoid the expense and inconvenience of changing to a smaller cutter and tracer, it is possible to cut these using the common cutter by using a special "Prep Key" which is made with a larger groove. This key has small valleys between adjacent #1 depth cuts on each track that allow the larger cutter to form opposing #1 depth cuts which are staggered as the pointers indicate.
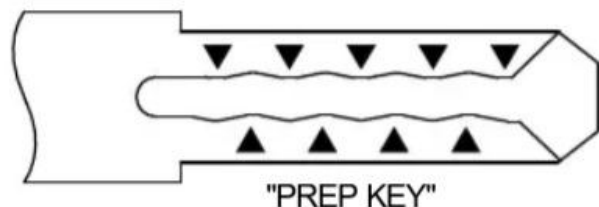
In using such a key for duplication, first copy the prep key onto your blank. Then, insert the original key and continue tracing what area you can beginning from the tip, until your guide will not pass between opposing cuts of the original key. Next, turn off the machine, raise the cutter / guide and set the guide into the next open area while aligning the cutter into the groove made previously by your prep key. Turn on your machine and trace every area you can. Depending on the cut combination, you may need to reposition the cutter again. Keys cut by this method will have a slightly different appearance from factory keys, but are just as accurate.
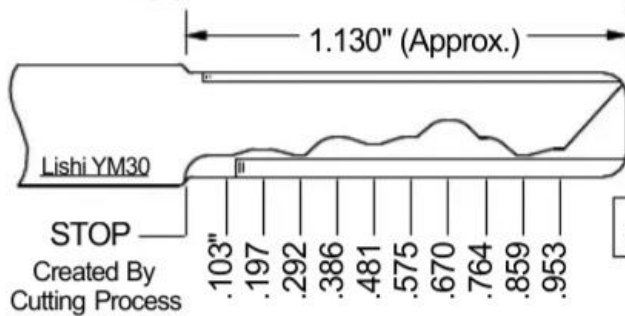
This manner of cutting by adding valleys between shallow depths is highly suitable for computerized machines, but at the time of this release it is not believed any manufacturer does this, nor is there a commercial source for a prep key as described.
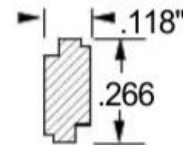
SIDEWINDER KEY BITTING
2014 EDITION

SAAB 2-Track

Lishi YM30

STOP
Created By
Cutting Process

1.130" (Approx.)

.103" .197 .292 .386 .481 .575 .670 .764 .859 .953

★ Code Series:
BC0001 - BC2865
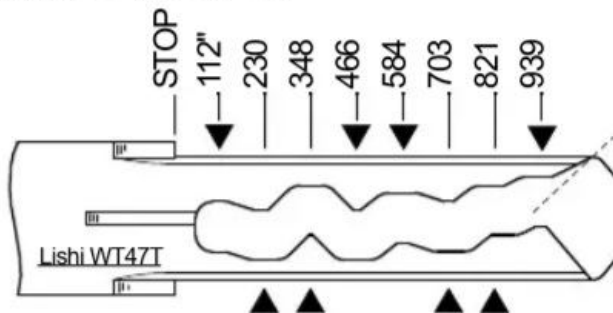2S0001 - 2S2675

.118"
.266

EXAMPLE
0 1 0 3 2 3 6 3 0 1

Odd positions use depths 0, 2, 4, 6 only
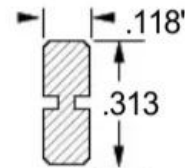Even positions use depths 1, 3, 5, 7 only

DEPTHS
0 - .211"
1 - .196
2 - .180
3 - .165
4 - .150
5 - .135
6 - .120
7 - .104
Incr. - .0152
Web - .040
MACS - 3

SAAB 4-Track '03+

STOP

.112" .230 .348 .466 .584 .703 .821 .939

Uniform Width Groove
.125"

Lishi WT47T

.118"
.313

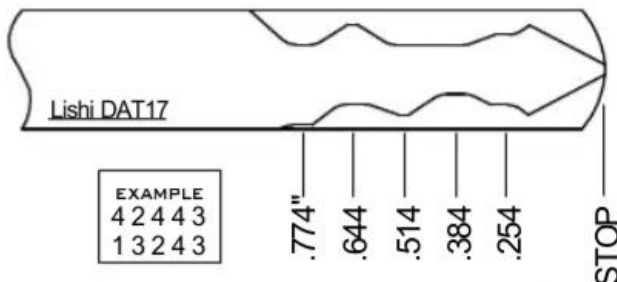★ Code Series:
DA 0001 - 2893 (7-cut)
DB 0001 - 4500 (8-cut)

DEPTHS
1 - .138" - (A)
2 - .116 - (B)
3 - .095 - (C)
4 - .073 - (D)
5 - .051 - (E)
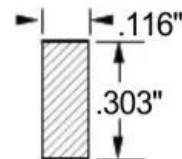Incr. - .0217
Web - .025
MACS - 3

Unlike other sidewinder keys with a uniform width center groove, the tumblers in these locks alternate contact of the left and right track as indicated by the pointers. Opposing cut depths have an inverse relationship which renders a uniform width groove. When coding original keys, care must be taken to use proper cut root width and bitting angles to allow the tumbler protrusion height of .118" (3mm) to pass freely through the groove. Cars which use this as the emergency key within a fob key (the 9- 3) have only the tip seven cuts.

The published codes reflect the bitting for the left track. The opposing right track depth for each position will always be 6 minus the left track depth. Tumblers are stamped with letters A through E which correspond to the depth of cut and track (left/right) which the tumbler contacts. For instance, if the first two positions are cut 2 1 (left track), then the first two cuts of the right track would be 4 5. The first two tumblers in the lock would be B E since with the first position the tumbler contacts the left track, and with the second position the tumbler contacts the right track. It is vital to understand this relationship when decoding a lock. The key depicted would correspond to a code bitting 2 1 4 1 3 2 4 5. The right track would be cut 4 5 2 5 3 4 2 1 and the lock combinated B E B A C D B E bow to tip.
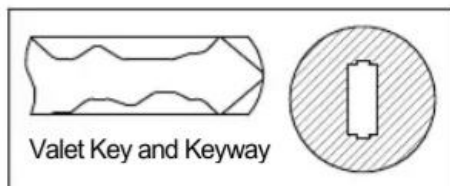
SUBARU '08 +

★ Code Series:
T0001 - T3000

Lishi DAT17

EXAMPLE
4 2 4 4 3
1 3 2 4 3

.774" .644 .514 .384 .254

STOP

.116"
.303"

DEPTHS
1 - .292"
2 - .266
3 - .240
4 - .215
Incr. - .0256
Web - .037
MACS - 2

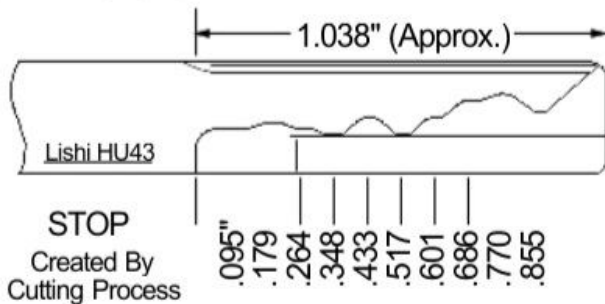MASTER / VALET: Secondary locks have a keyway that is warded which prevents an uncut blank from entering. Valet keys are cut with a more obtuse tip angle which creates a section that is full blank height ahead of the 5th cut position. This prevents the valet key from entering. Because of the necessary bitting angle for valet keys, a number 4 cut depth is never used in the 5 th position.
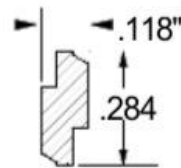
Valet Key and Keyway

SIDEWINDER KEY BITTING
2014 EDITION

PONTIAC GTO

1.038" (Approx.)

Lishi HU43

STOP
Created By
Cutting Process

.095"
.179
.264
.348
.433
.517
.601
.686
.770
.855

★ Code Series:
H0001 - H3000
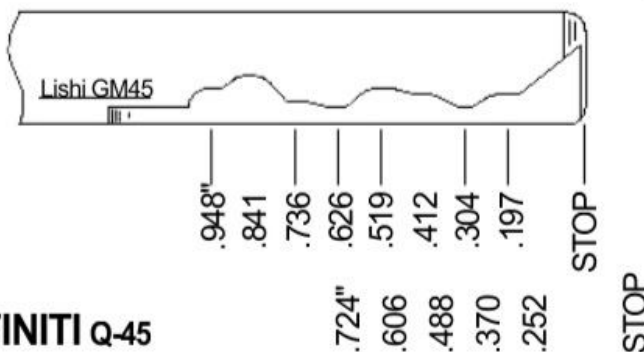
EXAMPLE
3 4 3 2 5 2 5 8 9 6

.118"
.284

Odd positions use depths 1, 3, 5, 7, 9 only
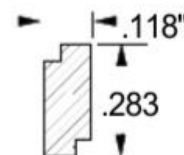Even positions use depths 2, 4, 6, 8 only

DEPTHS
1 - .198"
2 - .183
3 - .169
4 - .154
5 - .140
6 - .125
7 - .111
8 - .096
9 - .082
Incr. - .0146
Web - .040
MACS - 3

PONTIAC G8 / CHEVROLET Caprice 11+

Lishi GM45

.948"
.841
.736
.626
.519
.412
.304
.197
STOP

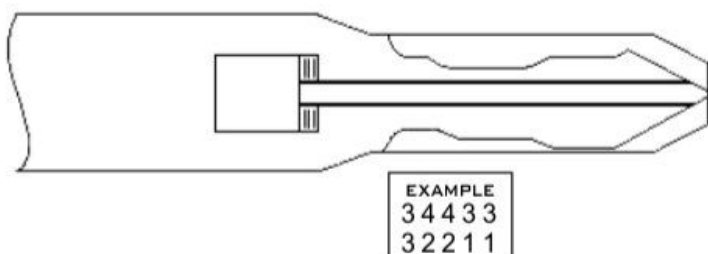★ Code Series:
60000 - 62113

EXAMPLE
4 6 2 1 4 3 1 3

.118"
.283

DEPTHS
1 - .239"
2 - .223
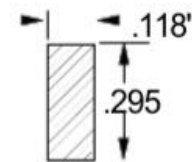3 - .207
4 - .191
5 - .176
6 - .160
Incr. - .0157
Web .045
MACS - 4

INFINITI Q-45

.724"
.606
.488
.370
.252
STOP

EXAMPLE
3 4 4 3 3
3 2 2 1 1

★ Code Series:
0001 - 6000

Master   Valet

.118"
.295

DEPTHS
1 - .286"
2 - .262
3 - .239
4 - .215
Incr. - .0236
Web - .040
MACS - 2

HONDA

1.005"

.719
.599
.480
.360
.241
STOP

Lishi HON66

EXAMPLE
3 2 1 1 5
1 2 6 2 3

Key must be cut to #1 depth
to this point in order to bypass
keyway warding In the lock.
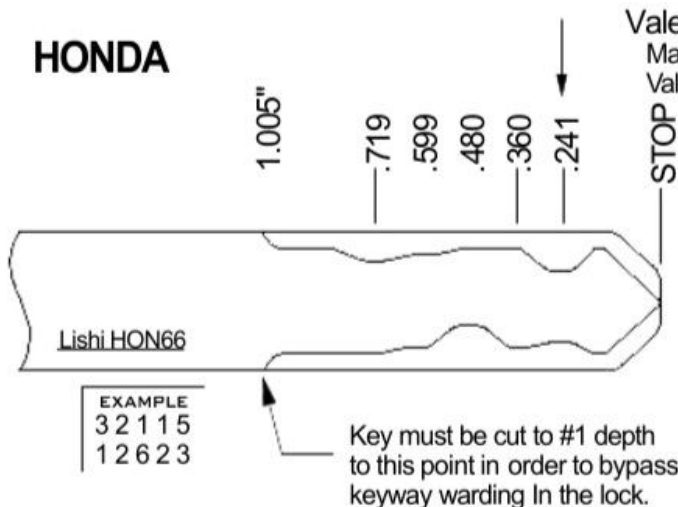
Valet Cut - Left Track
Master = 5
Valet = 2

★ Code Series:
J,K,L,M 000 - 999

.118"
.352

Keyway of Lock

NOTE: The uncut center web of the key
should be .035". If the web exceeds .040",
the cut key will not enter the lock.

Some code publishers display this series showing 6 spaces.
Ignore the last space (it is always a #1 depth both tracks). Some
compartment locks do contain a tumbler in the sixth position. The
cut in the 5th position on the right track will only be a#3 or #5 depth.
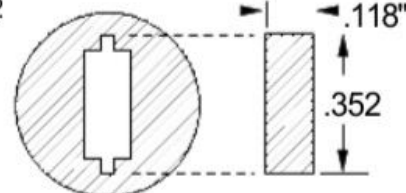
DEPTHS
1 - .312"
2 - .298
3 - .283
4 - .269
5 - .255
6 - .241
Incr. - .0142
Web - .035
MACS - 4

SIDEWINDER KEY BITTING

2014 Edition

LAND ROVER 4-Track
RANGE ROVER '95 to '02

.250" .376 .502 .628 .754
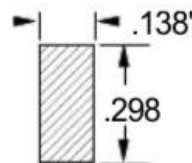
STOP

.292 .418 .544 .670 .796
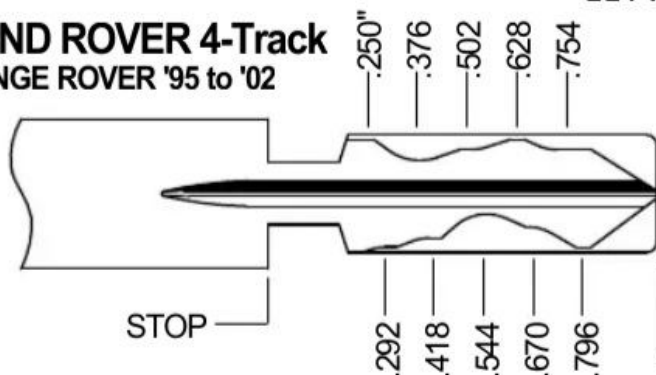
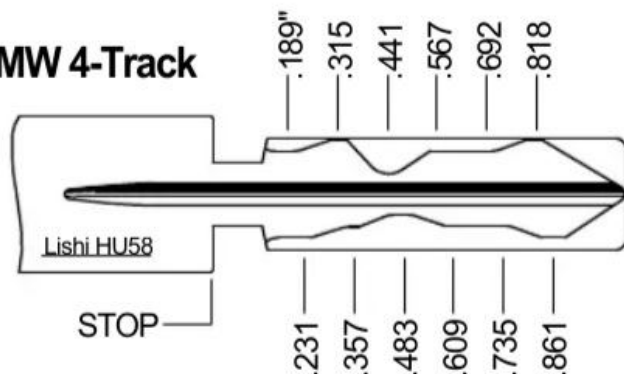★ Code Series:
0001 - 6000

EXAMPLE
1 3 2 1 2
1 2 4 3 1

Master   Valet

.138"
.298

DEPTHS
1 - .285"
2 - .261
3 - .234
4 - .202
Web - .040
MACS - None
Variable Increment!
(.6, .7, .8 mm)

BMW 4-Track

Lishi HU58

.189" .315 .441 .567 .692 .818
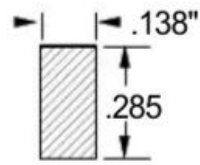
STOP

.231 .357 .483 .609 .735 .861

★ Code Series:
BH011450 - BH241450

EXAMPLE
2 1 4 2 2 1
2 3 4 3 3 2

Master   Valet

.138"
.285

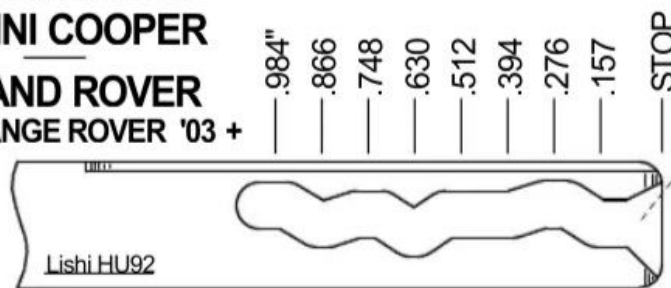**DEPTHS**
1 - .276"
2 - .253
3 - .225
4 - .194
Web - .040
MACS - None
Variable Increment!
(.6, .7, .8 mm)

BMW 2-Track
MINI COOPER
LAND ROVER
RANGE ROVER '03 +

Lishi HU92

.984" .866 .748 .630 .512 .394 .276 .157 STOP

Tumblers contact the right track only

EXAMPLE
1 3 2 4 2 2 1 3

Uniform Width Groove
.118" (3mm)

★ Code Series:
HBA0001 - HBA6000

Master   Valet

BMW - Rover

Mini Cooper

.118"
.321
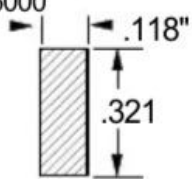
DEPTHS
1 - .150"
2 - .126
3 - .103
4 - .079
Incr. - .0236
Web - .025
MACS - 2

BMW 2-Track
NEW FORMAT '11 +

Lishi HU100R

.886" .779 .673 .567 .461 .354 .248 .142 STOP
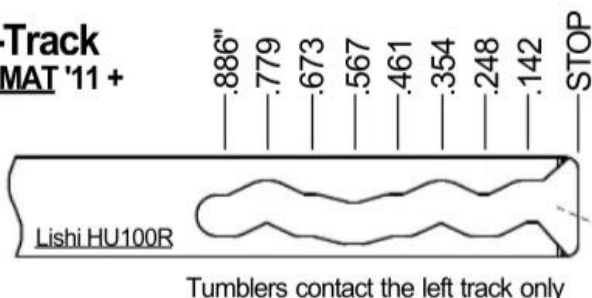
Tumblers contact the left track only

★ Code Series:
Z0001 - Z6000 ?

EXAMPLE
2 4 2 1 2 4 2 4
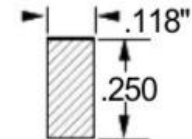
Uniform Width Groove
.105"

.118"
.250

DEPTHS
1 - .113"
2 - .093
3 - .074
4 - .054
Incr. - .0197
Web - .025
MACS - None

The BMW HU100R key is the reverse format of the common GM HU100 key. This means the bitting is referenced from the left track, instead of the right track. Like the GM codes, this is also a "Z" prefix, but the bittings are not the same as the GM "Z" code series. Codes are not published as of this printing, and the full code range is not certain.

SIDEWINDER KEY BITTING

2014 EDITION

VOLVO 4-Track '88 - '92
OLD FORMAT
(Opposing Tumblers Aligned)

.715" .542 .369 .196 STOP
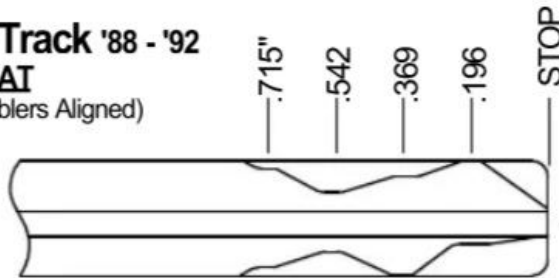
EXAMPLE
2 5 3 1
2 4 1 5

★ Code Series:
0AAAA - 9XXXX
Note: The tumblers in
the '88 - '92 locks are
diecast zinc alloy.

Master   Valet
.118"
.293
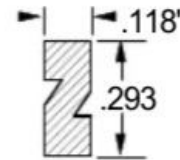
DEPTHS
1 - .292"
2 - .272
3 - .253
4 - .233
5 - .214
Incr. - 0197
Web - .040
MACS - None
*Z - .138

VOLVO 4-Track '93 +
NEW FORMAT
(Opposing Tumblers Staggerd)

.763" .590 .417 .244 STOP

Lishi NE66

EXAMPLE
3 1 2 4
4 3 1 2

.677 .503 .330 .157
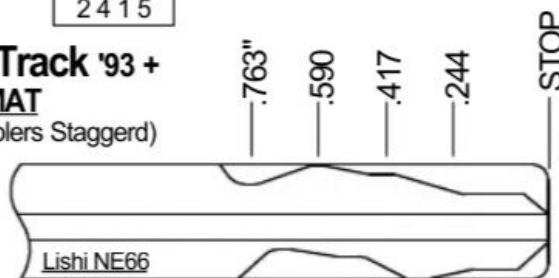
★ Code Series:
1V00000 - 5V12295

KM USA
VOLV
GREEN

The "VOLV" key is used
on construction equipment.
The keys are all the same
Left Track   1545
Right Track 4231
But these are cut using the
OLD format specification.

DEPTHS
1 - .292"
2 - .267
3 - .241
4 - .216
Incr. .0256
Web - .040
MACS - None

VOLVO 2-Track

1.025" (Approx.)

Lishi HU56

STOP

Created By
Cutting Process

.105" .211 .316 .422 .527 .633 .738 .844
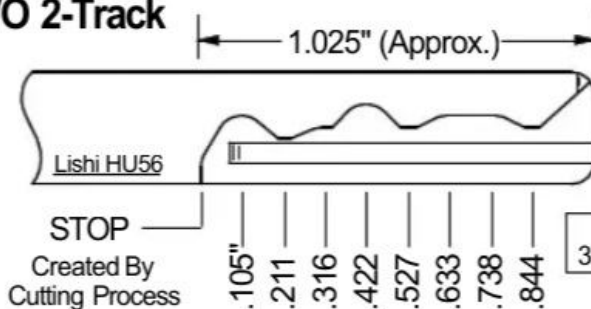
EXAMPLE
3 1 2 4 2 3 3 2

Master   Valet
.138"
.287

★ Code Series:
DH0001 - DH4000
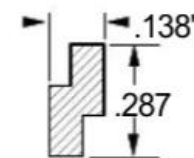
DEPTHS
1 - .170"
2 - .141
3 - .112
4 - .083
Incr. - .0291
Web .040
MACS - 2

VOLKSWAGEN / AUDI / PORSCHE

STOP 118" 236 354 472 591 709 827 945

Uniform Width Groove
.118" (3mm)

HAA
.059
.106

Lishi HU66

Tumblers contact the left track only
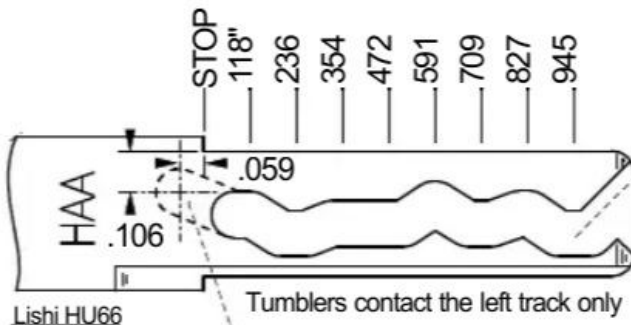
EXTENDED CUT
This is found on certain vehicles which use the transponder
to validate an electro-mechanical ignition lock. The cut
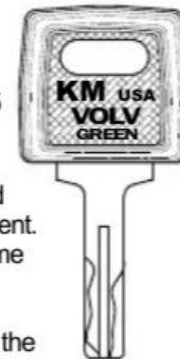root is in the same location for all keys, and interacts with
with an element to retain the key in the lock.

Master   Valet
.118"
.321
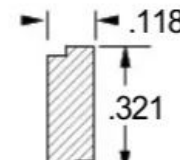
DEPTHS
1 - .150"
2 - .126
3 - .103
4 - .079
Incr. - .0236
Web - .025
MACS - 2

EXAMPLE
3 1 2 2 4 2 3 1

★ Code Series:
HAA 0001 - 8110
NAA 0001 - 8110 (Designates valet key)

SIDEWINDER KEY BITTING

FORD 10-Cut '11 +
JAGUAR '07 +
VOLVO '05 +
LAND ROVER '05 +

★ Code Series:
10001 - 11500 Ford / Jaguar
0001 - 4000 Rover
4000 - 9000 Volvo

← 1.102" (approx.) →

Lishi HU101

STOP
Created By
Cutting Process

.110"
.201
.291
.382
.472
.563
.654
.744
.835
.925

EXAMPLE
2 4 5 3 1 2 4 3 5 3

.118"
.2145

DEPTHS
1 - .178"
2 - .154
3 - .131
4 - .107
5 - .084
Incr. - .0236
Web - .038
MACS - 2

FORD 7-Cut '14+
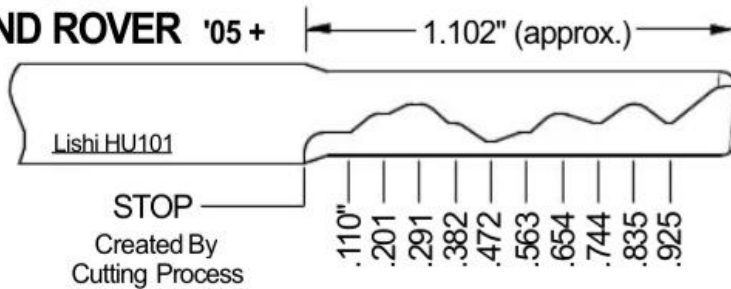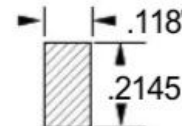### PEPS Fob Emergency Key

← .831" (approx.) →

STOP
Created By
Cutting Process

.110"
.201
.291
.382
.472
.563
.654
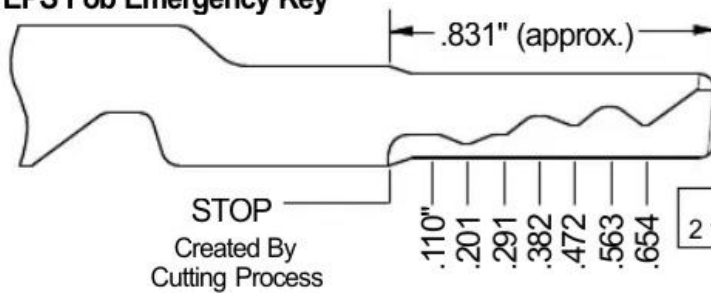
★ Code Series:
11501 - 13000

EXAMPLE
2 1 2 4 3 5 3

This very short blade may present an issue with some duplicators, as tip gauging from the closet position of the key vise may not allow the widened portion of the blade to be outside the grip range. One tactic to facilitate duplication is the shim both the pattern key and blank slightly by the same distance back from the stop gauge.

GENERAL MOTORS 8-Cut '08 +
SAAB '08 +

Tumblers contact the right track only
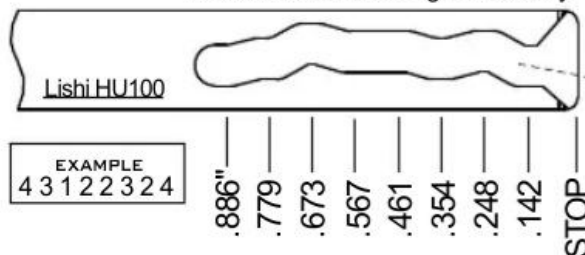
Lishi HU100

★ Code Series:
Z0001 - Z6000

EXAMPLE
4 3 1 2 2 3 2 4

.886"
.779
.673
.567
.461
.354
.248
.142
STOP

Uniform Width Groove
.104"

.118"
.250

DEPTHS
1 - .113"
2 - .093
3 - .074
4 - .054
Incr. - .0197
Web - .028
MACS - None
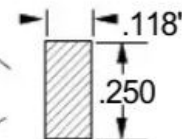
GENERAL MOTORS 10-Cut '14 + Trucks

Tumblers contact the right track only

EXAMPLE
2 1 1 3 4 2 4 3 2 1

1.098"
.992
.886
.779
.673
.567
.461
.354
.248
.142
STOP

Uniform Width Groove
.104"

★ Code Series:
V0001 - V5574

SIDEWINDER KEY BITTING

2014 EDITION

FIAT / MASERATI PIAGGIO

STOP .098" .201 .303 .405 .508 .610 .713 .815

Lishi SIP22

Tumblers Contact Left Track Only

EXAMPLE
3 1 1 2 1 3 1 3

Uniform Width Groove Approx. .100" ✱

★ Code Series:
DE0001 - DE11210

.118"
.297
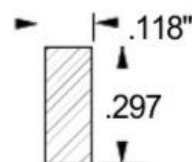
DEPTHS
(A) 1 - .166"
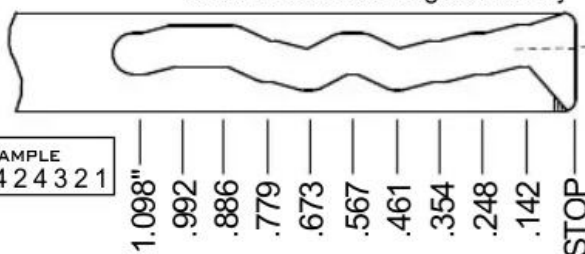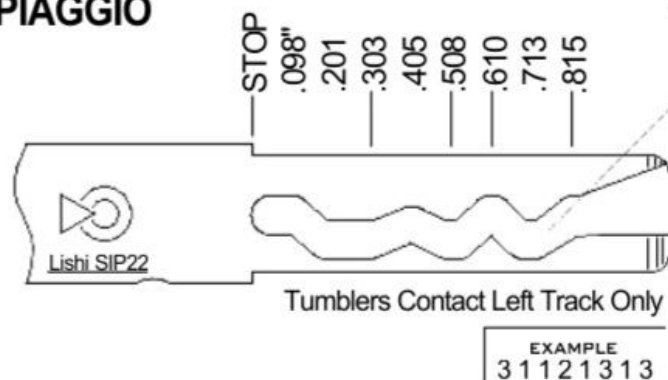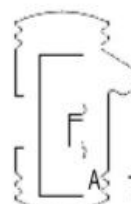(B) 2 - .135
(C) 3 - .103
(D) 4 - .072
Incr. - .0315
Web - .024
MACS - 2

Right   Left   Door Tumblers

✱ The groove is not actually a uniform width. Factory keys are cut using a smaller diameter cutter, and opposing tracks are closer where the bitting is angled between adjacent cuts that differ in depth. This may create a problem with a 2.5mm tracer fitting between opposing tracks during duplication.

Locks contain both left and right format tumblers. In the door locks, right format tumblers are marked with the cut depth, but the left format tumblers are designated with a corresponding letter (A-D). If you need to remove tumblers from door / compartment locks, uncrimp the scalp of the core and remove the flat tumbler retainer located underneath.

The ignition lock is sidebar, other locks are not. They are a different form tumbler and are marked with an opposite scheme as the other locks. This means the left format tumblers have numbers, and the right have letters.
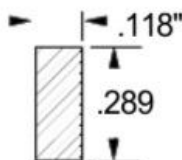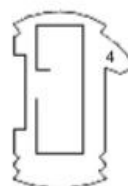
SMART CAR

.730 .626 .522 .417 .313 .209 STOP
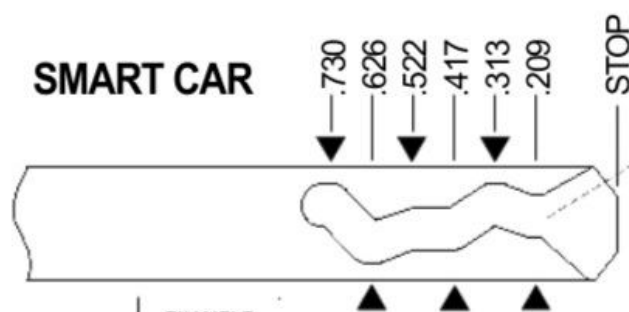
EXAMPLE
8 4 6 3 8 2
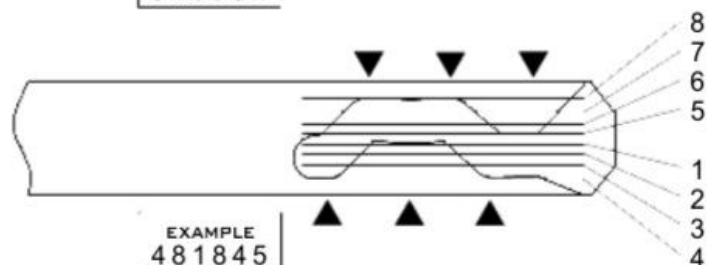
Uniform Width Groove .110"

.118"
.289

★ Code Series:
90001 - 99000 ?

DEPTHS
1 / 5 - .131"
2 / 6 - .107
3 / 7 - .077
4 / 8 - .042
Web - .037
Variable Increment!
(.60, .75, .90 mm)

Right   Left

EXAMPLE
4 8 1 8 4 5

8
7   Cut depths 5 - 8
6   register on
5   the left track

1
2   Cut depths 1 - 4
3   register on
4   the right track

Tumblers can be either left or right format. Left format tumblers have the protrusion for contacting the key on the same side as the spring tab, and right format the opposite. The tumblers are stamped with numbers with the right format tumblers numbered 1, 2, 3 or 4, and the left numbered 5, 6, 7 or 8. Locks will contain a combination of both left and right format tumblers.

These keys are cut with a uniform width internal groove, and tumblers alternate contact of the left and right tracks. Two possible bitting formats are shown, but other bitting formats have been observed (e.g. L R L R R R). The pointers indicate tumbler contact on the left and right tracks in the examples.

The locks use a combination of left and right format tumblers which are turned in different directions. Tumblers in positions 1, 2, 4 and 6 are biased opposite of tumblers in positions 3 and 6. The way a bitting is presented here requires that you account for the depth and which track each cut contacts.

For example, a #1 depth will be cut almost (but not exactly) the same as a #8 depth, with the difference being which track the tumbler registers on.

DECODING LOCKS: Orientation of the tumblers is unique. To fit a key from a lock, record the numbers stamped on each tumbler. Then convert the numbers in positions 3 and 6 to the complementary cut according to the depth scheme (e.g. change 1 to 5, 2 to 6, etc.).

Therefore, a lock with tumblers stamped 3 8 5 8 4 2 (bow to tip), will convert to bitting 3 8 1 8 4 6. The way the bitting is represented here is contrived, as no factory bitting-from-code information is available at the time of this printing, nor is the full code range known.

It is very difficult to properly code original keys for this series without the use of computerized key machinery.

Coding Original Sidewinder Keys

. . . *Using Depth Keys*

There are various methods of generating sidewinder keys to a specific combination (or cutting by code). A basic method which can be performed with the common sidewinder duplicating machine is to use depth keys.

Depth keys are a special set of keys in which each key has all the same depth cut, for all positions. A set of keys will consist of one key for each depth cut. This means that if there are four depths used in a particular series, there will be four depth keys in the set.

4-E   3-E   2-E   1
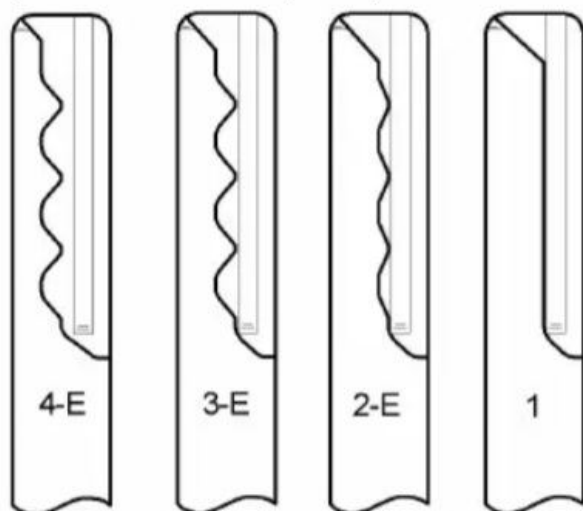
Each depth key will have the even numbered positions cut on one side of the key, and the odd positions on the opposite side. The reason is to facilitate creation of a proper transition between adjacent cuts when tracing from a key.
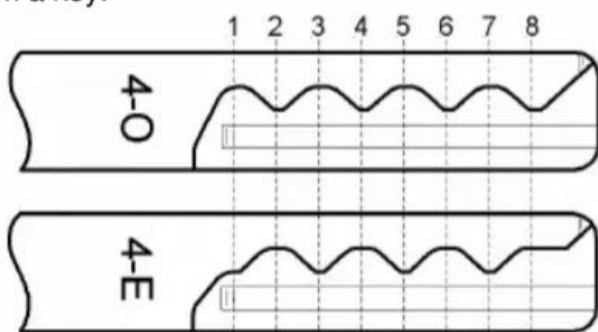

When cutting any sidewinder key, It is important to understand it's characteristics such as how the key stops, and the number of depths and spaces. The process of cutting a Volvo 2-track key to combination 31242332 will be presented as an example. It may be advantageous to write the bitting in a way to easily discern the odd and even cuts as such:

| O	E	O	E	O	E	O	E
3	1	2	4	2	3	3	2

Begin by duplicating the complete # 1 depth key onto the blank. Follow by selecting the next appropriate depth key. With the sample bitting, # 2 depths are used in both odd and even positions. Use the **2-E** side of the depth key and trace the cut for position 8, then turn the depth key over and use the **2-O** side to trace only cuts for positions 3 and 5.

Continue through the sequence for all applicable depths and positions which pertain to the combination you are cutting. When completed, you will have a key which should function, but lacks finished quality.
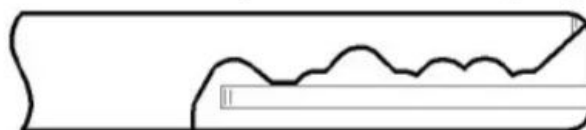
All sidewinder keys are laser cut (no steeples), which ensures ease of operation and reduces premature wear of the lock tumblers. Therefore, it is highly desirable to optimally contour the bitting. Steeples can be removed from adjacent cuts of the same depth by carefully moving the carriage until the cutter just touches the root of a cut, then cutting away the metal between. Many machines have a feature allowing you to lock the x-axis of the carriage which aids this process.

It is also best to modify some of the bitting angles between adjacent cuts which differ by only one or two depths. Modifying the bitting angle is much more difficult, but can be done with care. The finished key will have a smooth transition between adjacent cuts.
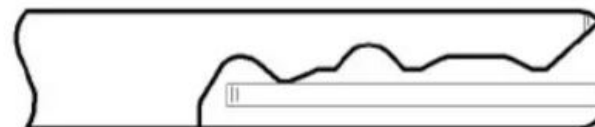
Certain keys may have special considerations when originating. For instance, with internally cut keys such as Lexus, you may need to code the left and right tracks on separate sides of a blank, then trace each track on to another blank for the completed key.

Coding both sides of a key vs. duplicating from the one side created is an issue. Any time you make a duplicate from a duplicate, you are likely to affect accuracy. Know the accuracy of your duplicator and the specifications for the key you are cutting, so that you may compensate if necessary.

Coding Original Sidewinder Keys

... Using Pattern Keys

Sidewinder keys and locks are generally more sensitive to wear related problems due to their distinct interaction of the key and tumblers. Factory sidewinder keys are always laser cut (no steeples), and have the bitting angle optimized between adjacent cuts to minimize wear.

The classic method of coding original sidewinder keys is to use depth keys, by tracing each cut position from a special set of keys. A problem with originating keys by this method is the lack of control in creating a key with ideal contour between the cuts.

One alternate method of originating is to create a pattern key. A pattern key is made from blank material, and is essentially a silhouette of the bitting for the sidewinder key. Advantages to using the pattern key method are the ability to efficiently remove steeples, achieve optimal bitting angle, and make adjustments to control accuracy. All externally cut 4-track keys may be easily originated with pattern keys. With some exceptions, most other types would need special preparation, therefore this method is not as practical to use.

Once the pattern is made, any number of keys may be traced without affecting accuracy as would be inherent when tracing from a key generated from depth keys.

HONDA KEY   SHOULDER STOP KEY   TIP STOP KEY
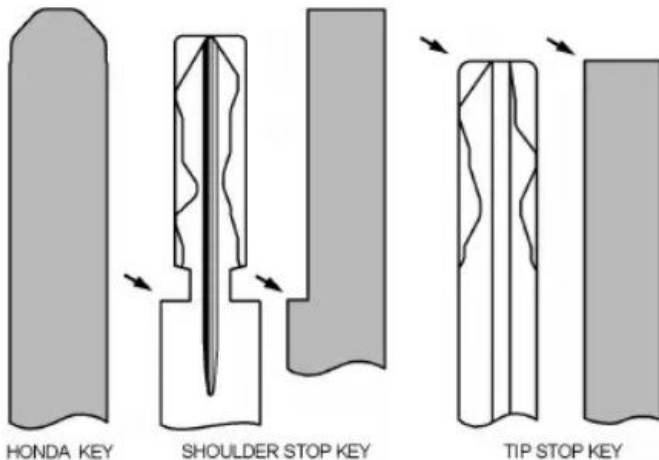
The Honda sidewinder service key is ideal for making most pattern keys. Begin by cutting to the same height as the blank for the key type you are working with. If you are creating a key for a type which tip stops, then blunt and square the tip of the pattern key. If you are working with a key which uses a shoulder stop, then form that in your pattern. There is no need to create a shoulder on both sides of the pattern, but form the shoulder on the same as the fixed side of the vise of your duplicator (Matrix - left side, Bianchi - right side).

After you have created a blank pattern key to the proper dimensions for the type you are cutting, use the bitting specifications with your code machine to cut the combination you need.
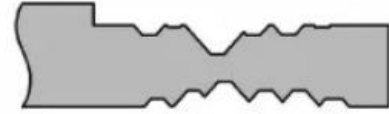
If you cannot laser cut with your code machine, then file the steeples by hand on the pattern. You can also adjust the bitting angle by hand filing between adjacent cuts as necessary.

For proper registration, your pattern must be created in a way so there is full blank height supporting the key in the vise on the fore and aft end of the combination cuts.
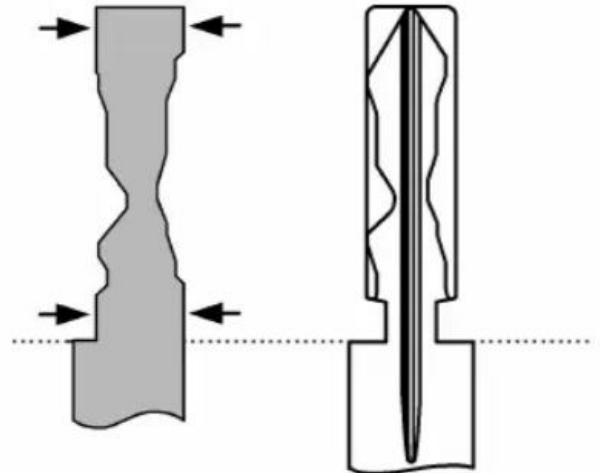
Simply duplicate from the pattern to the sidewinder blank. Most keys will require an additional procedure of forming the tip lead-in angle. The easiest way to do this is simply trace the tip area from a factory key. In particular, the Honda key will require cutting a # 1 depth a certain distance uniformly in front of the first cut position (see the bitting specification). The key below illustrates a 'prep key' which may be used for this purpose. It also creates the tip lead-in, and a #5 depth on the left track, fifth position, which is present on all master keys.